References

A necessarily idiosyncratic list of several references with short comments to help you navigate them.

It is divided in three sections: in addition to GR and Cosmology books, there is a section including a few reviews on inflation, CMB physics and large scale structure.

General Relativity

- S. Weinberg — *Relativity and Cosmology*
  A great and comprehensive book, which strikes a balance between the geometric interpretation and the field theory one. Regarding cosmology, you should definitely look at the chapters on symmetries and Killing vectors, and at the derivation of the FRW metric.
- R. P. Feynman — *Lectures on Gravitation*
  An original approach to General Relativity, derived as the field theory of a massless spin-2 particle. Emphasis is given to the physical ideas and the observable predictions of the theory. The section on cosmology is not very developed, but nevertheless an interesting read, with some historical and philosophical remarks.
- G. 't Hooft — *Introduction to General Relativity*
  These short lecture notes are available online, and go from special relativity to the usual applications of GR. They are very clear, especially when discussing the physical motivation at the basis of GR.
- P. A. M. Dirac — *Lectures on General Relativity*
  A short book, a bit concise in style. A no-frills introduction to tensor calculus.
- C. W. Misner, K. S. Thorne, J. A. Wheeler — *Gravitation*
  Affectionately referred to as the "phonebook" or the "bible", it is an encyclopædia of General Relativity. A go-to reference for many applications, heavily based on the geometric approach.
- L. D. Landau, E. M. Lifschitz — *Course in Theoretical Physics, Volume 2 - Classical Field Theory*
  This book covers special relativity, electromagnetism, and general relativity, in the usual Landau's pragmatic style. Especially useful are the many exercises, several of which are solved explicitly.
- R. Wald — *General Relativity*
  Useful introduction to the more formal aspects of General Relativity.

Cosmology

- S. Weinberg — *Cosmology*
  Borne out of lecture notes, it contains rigorous and explicit derivation of most of the theory of cosmology, from cosmography to CMB physics.
- V. Mukhanov — *Physical Foundations of Cosmology*
  A short and comprehensive course in cosmology, with a thorough explanations of the physical concepts and many exercises to work out the calculations. Especially interesting are the sections on inflation and the thermal history of the early universe.

- S. Dodelson — *Modern Cosmology*
  Clear introduction to cosmology, with a focus on perturbations, CMB physics and lensing. The chapter about data analysis is introductory but a must-read for any theorist.
- E. Kolb, M. Turner — *The Early Universe*
  A classic. I recommend in particular the discussion of the thermal history of the early universe.
- D. Baumann — *Cosmology*
  Lecture notes and lecture scripts, clear and easy to follow. A good introduction to all the subjects relevant to today's research.
- P. J. E. Peebles — *Large-scale Structure of the Universe*
  A classic, introducing the dynamics of large scale structure and its statistical description.

Special Topics

- V. Mukhanov — *CMB-slow, or How to Estimate Cosmological Parameters by Hand*
  This paper, astro-ph/0303072, derives analytically the spectrum of CMB fluctuations, providing intuition about its dependence on cosmological parameters.
- D. Baumann — *The Physics of Inflation*
  Lecture notes on inflationary physics. An extended version of the author's TASI lectures on inflation.
- L. Senatore — *Lectures on Inflation*
  Good informal lecture notes on inflationary physics, with strong accent on the physical intuition. As the abstract says: "Planning to explore the beginning of the Universe? A lightweight *guide du routard* for you."
- T. Jacobson — *Introduction to Quantum Fields in Curved Spacetime and the Hawking Effect*
  This review, gr-qc/0308048, is an introduction to the physics behind inflationary perturbations and Hawking radiation. Everything is explained starting from the harmonic oscillator with time-dependent frequency, and it does only require a knowledge of basic quantum mechanics.
- E. Bertschinger — *Cosmological Dynamics*
  Les Houches lecture notes (astro-ph/9503125). A nice introduction to the formalism of large-scale structure. It starts with a Newtonian description, adequate for small scales. This is followed by general-relativistic perturbation theory, with an emphasis on the gauge issues and on the physical effects of the different modes.
- D. Hogg — *Distance Measures in Cosmology*
  Article (astro-ph/9905116) describing the different ways of measuring distances in cosmology, with references to the original literature.
- J. Binney, S. Tremaine — *Galactic Dynamics*
  This is an impressive book on the dynamics and formation of galaxies. A few interesting reads are the quick introduction to cosmology at the beginning, together with the problems, and the chapter on galaxy formation. You may also find useful the appendices and the sections on mathematical formalism.